

Building Web Apps with Flask | CMSC388J

Course Description

This course is an introduction to building secure, full-stack web applications with Python and Flask. We'll start with Python and Flask, and then subsequent weeks will cover how to add Flask extensions to your applications to implement common web app functionalities, how to protect your website from bad actors, and more! At the end of the course, you'll be able to deploy your app for the world to see.

Course Details

Instructor Name and Email:

- Michael Marsh <mmarsh@cs.umd.edu>

Facilitators' Names and Emails:

- Nikolay Pomytkin <pomytkin@cs.umd.edu>
- Dhanvee Ivaturi <dhanvee@cs.umd.edu>

Course Website: <https://cmsc388j.github.io>

Course Piazza: <https://piazza.com/umd/spring2021/cmsc388j>

Other Info:

- **Prerequisites:** CMSC216, CMSC250 with a C- or better
- **Textbook:** none
- **Credits:** 1
- **Semester:** Spring 2021
- **Seats:** 40
- **Lecture Time:** Fridays 1:00 p.m - 1:50 p.m ET
- **Location:** Online

Topics Covered

- Python
 - Variables, expressions, operators
 - Iterations, conditionals, collections
 - Functions
 - As first-class objects
 - Decorators
 - "Main" function
 - Built-in functions
- Web Application Security
 - Cross-site scripting (XSS)
 - Cross-site request forgery (CSRF)
 - SQL injections
 - Man-in-the-Middle attacks (MitM)
 - Token & Two-factor authentication
- Flask
 - Routing your web app
 - Templating
 - Adding extensions for more features
 - WTForms
 - SQLAlchemy
 - Talisman
 - Login
 - Creating your own
 - Logging
- User Management
- Blueprints
- HTML/CSS/JS
 - Bootstrap
 - Integrating other frameworks
 - Custom CSS/JS configuration
- Databases
 - SQL
 - SQLite
 - PostgreSQL
 - MongoDB
 - Cloud hosted
- Payments Integration
 - Stripe (possibly others, we're open to suggestions)
- App Deployment
 - Heroku / DigitalOcean
 - Python Anywhere
 - CI/CD
 - Github Actions
 - Serverless
- Version Control
 - Git

Schedule*

Date	Week	Topic	Assignment
01/29	1	Intro to Python	Python practice (P1) assigned
02/05	2	Flask Intro	P1 due, P2 assigned. Q1 assigned
02/12	3	Forms, CSRF	Q1 due
02/19	4	Databases & Injection Attacks	P2 due, P3 assigned. Q2 assigned
02/26	5	User Management	Q2 due
03/04	6	Bootstrap & more	P3 due, P4 assigned, Q3 assigned
03/11	7	Review, CSS & JS In-depth	Q3 due
03/18	8	SPRING BREAK	
03/25	9	Extensions	P4 due, P5 assigned, Q4 assigned
04/01	10	Logging, Workday	Q4 due
04/08	11	HTTP Headers & Talisman	P5 due, Final project assigned
04/15	12	Blueprints	
04/22	13	Two-Factor Authentication	Q5 assigned
04/29	14	Review, Payment Integration	Q5 due
05/06	15	Deploying your App	Final project due

*Note that this is a tentative schedule, and that the pace of the class may change.

Grading

Grades will be maintained on ELMS. You will be responsible for all material discussed in lecture as well as other standard means of communication (Piazza, email announcements, etc.), including but not limited to deadlines, policies, assignment changes, etc.

Any request for reconsideration of any grading on coursework must be submitted within one week of when it is returned. No requests will be considered afterwards.

Your final course grade will be determined according to the following percentages:

Percentage	Title	Description
50%	Programming Projects	Programming projects will be assigned throughout the semester, going over topics covered in lecture.
15%	Quizzes	The midterm will be on all material covered so far, testing your knowledge of the course on a high level.
35%	Final Project	By the end of the course, you should be experienced enough in to write a medium scale project. We'll be hosting it online afterwards!

Excused Absence and Academic Accommodations

See the section titled "Attendance, Absences, or Missed Assignments" available at [Course Related Policies](#).

Disability Support Accommodations

See the section titled "Accessibility" available at [Course Related Policies](#).

Academic Integrity

Note that academic dishonesty includes not only cheating, fabrication, and plagiarism, but also includes helping other students commit acts of academic dishonesty by allowing them to obtain copies of your work. In short, all submitted work must be your own. Cases of academic dishonesty will be pursued to the fullest extent possible as stipulated by the [Office of Student Conduct](#). It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism. For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.shc.umd.edu>.

Course Evaluations

If you have a suggestion for improving this class, don't hesitate to tell the instructor or TAs during the semester. At the end of the semester, please don't forget to provide your feedback using the campus-wide CourseEvalUM system. Your comments will help make this class better.

Thanks to the CS professors at the University of Maryland, College Park for the basic syllabus outline!